Translation

PCT/JP2003/004138

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference KRC-71PC	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/004138	International filing date (*day/month/year*) 31 March 2003 (31.03.2003)	Priority date (*day/month/year*) 02 April 2002 (02.04.2002)
International Patent Classification (IPC) or national classification and IPC B22D 11/10, 41/50, 41/54, C04B 37/02, 35/66		
Applicant KROSAKIHARIMA CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 20 October 2003 (20.10.2003)	Date of completion of this report 07 June 2004 (07.06.2004)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/004138

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:
pages 1-8, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement under Article 19
pages _____, filed with the demand
pages 1-4, filed with the letter of 22 March 2004 (22.03.2004)

☒ the drawings:
pages 1, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:
☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-4	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-4	NO
Industrial applicability (IA)	Claims	1-4	YES
	Claims		NO

2. Citations and explanations

The documents cited in the ISR are indicated as "documents 1-5" as follows.
Document 1: JP, 8-57601, A (Kurosaki Corporation), March 5, 1996 (03.05.96)
Document 2: JP, 2-23494, B2, (Kurosaki Corporation), May 24, 1990 (05.24.90)
Document 3: JP, 2003-40672, A (Shinagawa Refractories Co., Ltd.), February 13, 2003 (02.13.03)
Document 4: JP, 6-305844, A (Kawasaki Steel Corporation), November 1, 1994 (11.01.94)
Document 5: JP, 8-283074, A (Nippon Steel Corporation), October 29, 1996 (10.29.96)

1. Claim 1

The invention of claim 1 does not appear to involve an inventive step based on the descriptions of document 1.

Document 1 (Figs. 1-6 and paragraphs 0018-0032) states, when "inner hole body 3" (table 1, composition example 8 of an inner hole) comprising 25 weight% of CaO is disposed on "immersion nozzle body 1," mortar etc. is used for fixing the both so as to dispose a 0.5-2.0mm joint for absorption of expansion by heating during use (paragraph 0021 in particular), and a gap caused by such joint roughly corresponds to the 0.5-2.5mm thickness of the joint of the present invention (specification, page 5). The thickness is "for absorption of expansion caused by residual heat prior to using a nozzle and by heating during use (paragraph 0021)"; therefore, considering the manufacturing process of ordinary nozzles (specification of the present application, page 3, lines 23-28), the thickness of the joint is presumed to be the value after drying.

In this context, "adjusting porosity" in the present application means "increasing and decreasing the amount of solvent and binder, or changing the fill amount" as in claim 2 of the present application, which is normally carried out at a conventional manufacturing site when using refractory composition used for constructing and repairing the various types of molten metal containers as described in document 4.

In such a case, as long as the thickness of the targeted joint is known, it is not found to be particularly difficult to conceive of "increasing and decreasing the amount of solvent and binder or changing the fill amount" with respect to the mortar serving as adhesive in order to achieve the thickness/gap, in other words, adjusting the porosity, and adopting 15-90% porosity could be achieved through design.

2. Claims 2 and 3

The inventions of claims 2 and 3 do not appear to involve an inventive step based on the descriptions of documents 1 and 4.

Document 4 (paragraphs 0007-0013) discloses a refractory composition used for constructing and repairing various types of molten metal containers, comprising MgO as a primary component, ethylene glycol (paragraph 0011) and novolac type phenol resin (paragraph 0010) as solvent and binder; therefore it is presumed that the porosity of the composition could be changed by increasing and decreasing solvent and binder or manipulating the fill amount, and no particular difficulty is found in adopting it in place of the mortar of document 1.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of Box V:

3. Claim 4

The invention of claim 4 does not appear to involve an inventive step based on the descriptions of documents 1 and 5.

Document 5 (claim 1) discloses a refractory mortar compounding 75-95 weight parts of magnesium (MgO) with a particle size of 0.3mm or less and 25-5 weights part of alumina; therefore, it is projected that by converting weight part into mass%, this is included in the invention of this claim, and no particular difficulty is found in adopting it in place of the mortar stated in document 1.

Document 2 discloses an immersion nozzle that can reduce the adhesion of alumina caused by material comprising CaO; however, it does not disclose inserting the material in a sleeve shape into the refractory inner part of the body and then using.

Document 3 (in particular paragraphs 0012 and 0025) describes molding a refractory article for a refractory member for continuous casting comprising 5-40 mass% of CaO into a sleeve shape and inserting the same into the inner part of the refractory article body; however, it does not disclose the intervals therebetween or bonding agent.